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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,003

03/21/2006

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EXAMINER

LAIOS, MARIA J

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

02/27/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/573,003	<b>Applicant(s)</b> MERLO ET AL.	
	<b>Examiner</b> MARIA J. LAIOS	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 March 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This office action is in response to the amendment filed on 29 October 2007. Claims 1, 2 and 4-13 have been amended. Claims 3 and 14 have been cancelled. Claims 1-2 and 4 - 13 are finally rejected for reasons necessitated by applicant's amendment and for the reasons of record.

### ***Drawings***

2. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described

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in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The conductive spacer claimed on line 11 is located in figure 1 which is considered prior art by the applicant. This feature is not in figures 3-7 which depict the embodiments of the current invention.

5. Claims 2 and 4-13 are also rejected because they depend upon a rejected claim.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faita et al. (EP 0629 015 A1) in view of Applicant's prior art (see applicant's specification on Page 6 line 24- Page 7 line 5).

With respect to claim 1, Faita et al. discloses a stack comprising a plurality of fuel cells (Figure 6); a cooling fluid (which provided in the internal ducts and used for cooling); a plurality of metal bipolar plates (2, Figure 2) and gaskets (8, Figure 3) having passage openings (2 and 9) for inlet and outlets of the reactant gas, and for injecting and discharging a cooling fluid (5). Each fuel cell comprises an ion exchange membrane (6) with two sides, a current collector (14) on each side of the membrane (figure 6). The gasket (8) framing the perimeter of the current collector (Figure 6- the gasket is next to the current collector therefore it will cover the perimeter

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of the current collector. Each fuel cell delimited by the bipolar polar plates (Figure 6) but fail to disclose a cooling device comprises an electrically conductive spacer. Applicant's admitted prior art discloses a cooling device comprising an electrical conductive spacer and the cooling fluid flows through the cooling device (Page 6 line 29-31, the bipolar plates and the conductive spacer make up the cooling device, 9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the cooling device of Admitted Prior Art in the fuel cell of Faita because the spacer maintains the electrical continuity between adjacent bipolar plates and the fluid flowing through the cooling device keeps the fuel cell at the temperature required for it to run efficiently.

With respect to claim 6, Faita et al fails to explicitly disclose the water is circulating in a closed circuit. However, Faita et al discloses the forced circulation of demineralized water to control the temperature (Page 10 line 41) as in a cooling circuit (page 2 line 10). This would indicate that the circuit is closed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have water circulating in a closed circuit in order to make the fuel cell mobile and to save cost on reusing the water.

8. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faita et al (EP 0629 015 A1) in view of Admitted Prior Art (see Applicant's Specification pages 6 line 6 to

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page 10 line 14 and Figures 1 and 2) as applied to claim 1 above, and further in view of Abd Elhamid et al (US 2005/0267004 A1).

With regard to claim 4, Faita discloses the structural components as discussed above in claim 1 and incorporated herein, and teaches the bipolar plate (1) may be constructed of stainless steel (page 5 line 19) but fails to disclose the composition of the stainless steel. Abd Elhamid et al. teaches a PEMFC in which the bipolar plates have a stainless steel composition of at least 16 percent by weight of chromium, nickel is at least 20 percent by weight and molybdenum is at least 3 percent by weight in order to provide a high bulk electrical conductivity and corrosion resistance (Paragraph 34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use stainless steel having a composition of at least 16 percent by weight of chromium, nickel at least 20 percent by weight and molybdenum at least 3 percent by weight for the bipolar plates of the electrochemical cell stack of Fatia in order to provide corrosion resistance electrical conductivity as taught by Abd Elhamid et al.

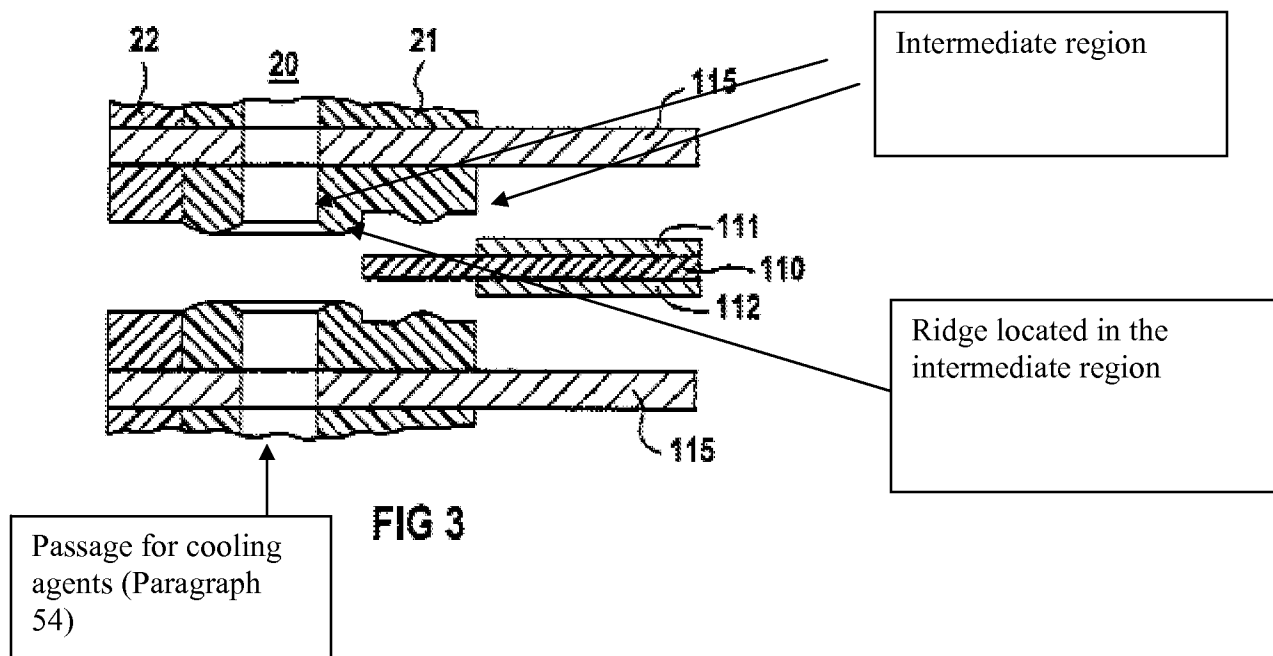
With regard to claim 5, Abd Elhamid et al. further explains that the bipolar plate is a metal substrate (Paragraph 55) this metal substrate/electrically conductive element can be made of stainless steel 316L (Paragraph 38).

9. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faita et al. (EP 0629 015 A1) in view of Applicant's prior art (see applicant's specification on Page 6 line 24- Page 7 line 5) as applied to claim1 above, and further in view of Baldauf et al (US 2003/0027031 A1).

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The references of Faita and the Applicants' prior art are discussed above and incorporated herein.

Faita modified by the Applicant fail to disclose the edge of the membrane in the intermediate region defined by the boundary of the center hollow portion in the gasket and the circumference of the passage openings. Baldauf et al. disclose a fuel cell stack with a gasket and a membrane. Baldauf discloses the perimeter of the membrane (110) in the intermediate region (see figure below)



It would have been obvious to one of ordinary skill in the art at the time of the invention in include the seals of Baldauf in the fuel cell system of Faita modified by Admitted Prior art because this would prevent the interaction of the fluids traveling through passages with the membrane.

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10. Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Faita et al. (EP 0629 015 A1) in view of Applicant's prior art (see applicant's specification on Page 6 line 24- Page 7 line 5). as applied to claim1 above, and further in view of Kikuchi et al. (US 2003/0162078 A1). With regard to claim 2, Faita modified by Applicant's prior art discloses the structural components as discussed above in claim 1, but fails to mention a bipolar plate closest to the negative terminal is free of passage openings. Kikuchi et al. discloses a fuel cell in which there are terminal plates/bipolar plates (34a, 34b) free of openings for only the plate that is closest to each of the ends of the cell. It would have been obvious to one of ordinary skill in the art at the time of the invention to place the terminal plates near the ends of the cell without openings in order to prevent fluids from passing near the terminal ends.

1. Claims 9 and 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Faita et al. (EP 0629 015 A1) in view of Applicant's prior art (see applicant's specification on Page 6 line 24- Page 7 line 5) as applied to claim1 above, and further in view of Schmid et al (US 6080503) and Wald et al. (US 7087339 B2).

With respect to claim 9, Faita et al. modified by Applicants admitted prior is discussed above and incorporated herein but fails to disclose the membrane with opening being larger in size than the gaskets around the membrane. Schmid et al. discloses a PEM fuel cell and discloses the openings of the membrane (5MEA figure 5a, the passageway (30) are aligned with the holes in the membrane) is larger than the passage ways (30) which allows for the bonding agent/sealing



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element (50) to encapsulate the edges of the membrane to prevent damage to the membrane (col. 8 lines 48-51).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the membrane of Faita with the membrane of Schmid because Schmid teaches the opening of the membrane larger than those of the holes that allow for the passage of fluids this prevents the damage of the membrane by allowing for the bonding agent/sealing agent to protect the membrane.

However Faita et al. modified by Applicants admitted prior art and Schmid fail to disclose the sealing element as a non conductive O-ring or gasket. Wald et al. discloses a fuel cell membrane and teaches a gasket can be made of any suitable elastomeric material including silicones, thermoplastic elastomers and elastomeric adhesives col. 6 lines 1-8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the adhesive sealing agent of Schmid et al. with a gasket because both are known to be effective sealants in fuel cells and Wald et al. teaches that they are recognized equivalents for the same purpose. See MPEP 2144.06.

With respect to claim 10, Wald et al. further discloses the gasket to be EPDM rubber (col. 6 lines 5).

2. Claims 11-13 rejected under 35 U.S.C. 103(a) as being unpatentable over Faita et al. (EP 0629 015 A1) in view of Applicant's prior art (see applicant's specification on Page 6 line 24-Page 7 line 5), Schmid et al (US 6080503) and Wald et al. (US 7087339 B2) as applied to claim 9 above, and further in view of Barton et al. (US 6423439 B1).

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The disclosures of Faita, Applicant's admitted prior art, Schmid, and Wald et al. are discussed above and incorporated herein.

With respect to claim 11, Faita, Applicant's admitted prior art, Schmid, and Wald et al. fail to disclose the non conductive elastomer material is in liquid form and cured by UV or thermal treatment.

With regard to claim 11, Barton et al discloses an elastomer material for a sealant material/non conductive material is flow processable/liquid at the moment of assemble and polymerized by thermal treatment (col. 3 lines 55-63). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the elastomer of Wald with the liquid polymer of Barton et al because both are known to be effective sealants in electrolytes and the Wald et al. references teaches that they are art recognized equivalents for the same purpose. See MPEP 2144.06.

With regard to claim 12 and 13, Barton et al discloses a liquid injection moldable compound for example silicones (col. 5 line 25) and from the applicants specification on page 11 "A suitable material is given by liquid silicon resins, which maintain a low hardness and a good elasticity also after completing the curing process" It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the elastomer of Wald with the liquid polymer of Barton et al because both are known to be effective sealants in electrolytes and the Wald et al. references teaches that they are art recognized equivalents for the same purpose. See MPEP 2144.06.

***Response to Arguments***

11. Applicant's arguments filed 29 October 2007 have been fully considered but they are not persuasive.

Claim 1 was amended to include the limitation of the cooling device with the conductive spacer. Since the conductive spacer with the bipolar plates are located in Figure 1, it is the Examiner's position that this is admitted prior art. On Page 6 line 11, Figure 1 is stated as prior art.

With respect to Applicant arguments that the cooling passages of Faita are optional, the Examiner remains unpersuaded because Faita still allows for the possibility of the cooling passages to be in the bipolar plates.

With respect to Applicant's arguments that the plate closest to the negative terminal is free of passage, the Examiner remains unpersuaded. The terminal plates are electrically connected to the outer most unit cells as such they still provide the same function as applicant's bipolar plate without holes.

With respect to Applicant's argument that Barton only identifies air and not liquid for the passage in which a seal is provided. Barton discloses that the seal is for fluids passing through the openings. The fluids include air and fuel, such as hydrogen and liquid fuel (col. 2 line 27). Therefore Barton allows the seal to be used for gas and liquids.

***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA J. LAIOS whose telephone number is (571)272-9808. The examiner can normally be reached on Monday - Thursday 9:30 - 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Susy N Tsang-Foster/  
Supervisory Patent Examiner, Art Unit 1795

MJL